

Claims

We claim:

1. A noise attenuation device for a vehicle exhaust system, comprising:

an exhaust pipe having a passageway for receiving exhaust gas pulses from an engine; and,

a plurality of vanes extending from an inner surface of said exhaust pipe and spaced apart from one another and disposed upstream of a discontinuity of said exhaust pipe, said vanes configured to reduce turbulence in said exhaust gas pulses flowing past said vanes to reduce noise generated at said exhaust pipe discontinuity.

2. The noise attenuation device of claim 1 wherein said vanes comprise metal vanes formed as punched out tabs in a ring of metal which is fitted within the passageway.

3. The noise attenuation device of claim 1 wherein said vanes comprise metal vanes provided by stamped out tabs of said exhaust pipe and wherein a collar surrounds said exhaust pipe adjacent said vanes.

4. The noise attenuation device of claim 1 wherein said plurality of vanes comprises one of plastic vanes, ceramic vanes, die-cast aluminum vanes, and cast-aluminum vanes.

5. The noise attenuation device of claim 1 further comprising an inner ring disposed in said passageway, said plurality of vanes extending from an inner surface of said exhaust pipe to said inner ring.

6. The noise attenuation device of claim 1 wherein said plurality of vanes form a honeycomb-shaped vane structure in said passageway.
7. The noise attenuation device of claim 1 wherein each of said plurality of vanes extends across said passageway, said plurality of vanes being generally parallel to one another.
8. The noise attenuation device of claim 1 wherein said plurality of vanes form one of a triangular vane structure and a rectangular vane structure in said passageway.
9. The noise attenuation device of claim 1 wherein said plurality of vanes comprise a wire mesh in said passageway.
10. The noise attenuation device of claim 1 wherein said plurality of vanes are disposed circumferentially around said passageway at a predetermined axial position in said passageway.
11. The noise attenuation device of claim 10 wherein each of said plurality of vanes extend a predetermined axial distance from said predetermined axial position in said passageway.
12. The noise attenuation device of claim 1 wherein said discontinuity changes a flow characteristic in said passageway.

13. An exhaust system for an internal combustion engine, comprising:

an exhaust pipe receiving exhaust gas pulses from the engine; and,

an air diffuser disposed upstream of a discontinuity of said exhaust pipe, said diffuser having an outer wall defining an internal bore communicating with said exhaust pipe, said diffuser further including a plurality of vanes extending from said wall and spaced apart from one another, said vanes configured to reduce turbulence in said exhaust gas pulses flowing past said vanes to reduce noise at said exhaust pipe discontinuity.

14. The exhaust system of claim 13 wherein said discontinuity changes a flow characteristic in said exhaust pipe.

15. The exhaust system of claim 13 wherein said discontinuity comprises a bend in said exhaust pipe.

16. The exhaust system of claim 13 wherein said discontinuity comprises a coupling location between two sections of said exhaust pipe.

17. The exhaust system of claim 13 wherein said discontinuity comprises a coupling between an exhaust pipe portion and an exhaust catalyst.

18. The exhaust system of claim 13 wherein said discontinuity comprises a region where a diameter of said exhaust pipe is generally increasing or decreasing.

19. The exhaust system of claim 13 wherein said diffuser comprises one of a plastic diffuser, a ceramic diffuser, a die-cast diffuser, and a cast-aluminum diffuser.
20. The exhaust system of claim 13 wherein said vanes of said diffuser comprise a wire mesh.
21. The exhaust system of claim 13 wherein said air diffuser further includes an inner ring, said plurality of vanes extending from said diffuser wall to said inner ring.
22. The exhaust system of claim 13 wherein said plurality of diffuser vanes form a honeycomb-shaped vane structure in said bore.
23. The exhaust system of claim 13 wherein each of said plurality of diffuser vanes extends across said bore, each of said vanes being generally parallel to one another.
24. The exhaust system of claim 13 wherein said plurality of diffuser vanes form one of a triangular vane structure and a rectangular vane structure in said bore.
25. The exhaust system of claim 13 wherein said plurality of vanes of said diffuser are disposed circumferentially around said wall equidistant from adjacent vanes.

26. A method for attenuating noise in an exhaust system of an engine, the method comprising:

flowing exhaust gas pulses from said engine through a portion of an exhaust pipe; and,

flowing said exhaust gas pulses through a plurality of vanes extending from an inner surface of said exhaust pipe to reduce turbulence in said exhaust gases flowing past said vanes to reduce noise generated at a downstream discontinuity in said exhaust pipe.